ACCESSION NR: AP4041994   S/0057/64/034/007/1199/1205

AUTHOR: Kreyndel', Yu.Ye.; Ionov, A.S.

TITLE: Some peculiarities of low pressure Penning discharges

SOURCE: Zhurnal tekhnicheskoy fiziki, v.34, no.7, 1964, 1199-1205

TOPIC TAGS: discharge plasma, ion beam, electron beam, Penning tube

ABSTRACT: The beam issuing from a central opening in one cathode of a Penning tube was caught in a Faraday cage and the ion and electron currents in the beam were measured separately as functions of the longitudinal magnetic field in the discharge region. The compositions of beams issuing from non-central openings were also determined, and the discharge was photographed. The single annular anode of the Penning tube was midway between the two cathodes, which were separated by 28 mm. The tube was continuously pumped, and the discharges were examined at pressures from 2×10^{-6} to 10^{-4} mm Hg. The discharge tube and the experimental arrangement are described in more detail elsewhere (Yu.Ye.Kreyndel',ZhTF 33,883,1963). At low magnetic fields the beam issuing from the central opening of the cathode consisted mainly of positive ions but had a substantial electron component. When the magnetic field was

Card
1/3

ACCESSION NR: AP4041994

increased to a certain critical value (800 Oe in one case) the electron component of the beam current increased sharply, and the total beam current became negative. The discharge was unstable in magnetic fields near the critical value, but in stronger fields it was stable with a negative beam current. By varying the distance of the Faraday cage from the Penning tube cathode it was found that the ion component of the beam was more divergent than the electron component. When the central beam current became negative, the current in beams issuing from openings near the periphery of the cathode remained positive and, indeed, increased. The beam current was nearly the same in tubes in which both cathodes had central openings as in those in which only one cathode was pierced. This shows that the electron component is not primarily due to secondary electrons emitted by the opposite cathode and traversing the tube rectilinearly. Photographs of the discharges showed that at low magnetic fields the luminosity was confined to the region of the anode and to a thin filament extending axially from one cathode to the other. This axial filament was present at all values of the magnetic field whether one, both, or neither of the cathodes was pierced. The luminous region about the anode extended toward the cathodes as the magnetic field was increased, and at the critical field it suddenly spread over the cathodes themselves. Orig.art.has: 6 figures.

Card
2/3

ACCESSION NR: AP4041994

ASSOCIATION: none

SUBMITTED: 14Sep63

SUB CODE: NP, EM

NR REF SOV: 004

ENCL: 00

OTHER: 004

Card
3/3

KREYNDEL', Yu. Ye.; IONOV, A.S.

Characteristics of discharges in Penning tubes at low pressures.
Zhur. tekh. fiz. 34 no.7:1199-1205 Jl '64   (MIRA 17:8)

S/029/60/000/07/22/024
B013/B058

AUTHORS: Belorusets, M., Engineer, Ionov, B., Engineer

TITLE: The Miracle Screen

PERIODICAL: Tekhnika molodezhi, 1960, No. 7, pp. 37-39

TEXT: The authors report on the manufacture of screen films for the graphic industry. The technology of the three classical printing methods, relief-, surface-, and intaglio printing, is explained in the introduction. The Moskovskiy poligraficheskiy institut (Moscow Polygraphic Institute) has set the problem to its Scientific Students' Society to develop screen films, the manufacture of which should be simpler and cheaper compared with the foreign material. These films should also produce perfect reproductions. Under the supervision of Nikolay Ivanovich Sinyakov, Docent, Candidate of Technical Sciences, the students developed several methods for the manufacture of screen films. The new material was tested under operational conditions and patented. Screen films for relief-, surface-, and intaglio printing were developed. The new screen-film material differs from common films by the fact that the silver halide crystals are in strict order in the

Card 1/2

The Miracle Screen

S/029/60/000/07/22/024
B013/B058

gelatinous emulsion layer. A picture composed of dots can thus be obtained
from a half-tone pattern without having to use a screen. The negative
represents a common half-tone picture behind an opaque screen in intaglio
printing. The diapositive obtained from this negative looks like the original
behind a transparent screen. Special screen films were developed for color
printing. The manufacture of these films is extremely simple. A screen is
recorded first on a common film. An emulsion layer, sensitive to any
tint, is then applied to the back of the base. The new screen films were
experimentally tested at the printing shops of the "Pravda" and the
"1-ya Obraztsovaya". The results were satisfactory. The new material was
recommended to the Moscow, Tatariya, and Latviya sovnarkhoz for test and
use. There are 6 figures.

Card 2/2

Ionov, B. D.

1. BUVERT, V. V., Prof.; IONOV, B. D., Docent; KISHINSKIY, M. I., Docent; SYROMYATNIKOV, S. A., Docent

2. USSR (600)

4. Lumbering

7. New textbook on land transport of timber ("Land transport of timber." Prof. V. V. Buvert, Docent B. D. Ionov, Docent M. I. Kishinskiy, Docent S. A. Syromyatnikov. Reviewed by M. A. Zav'yalov, G. T. Urtaev.) Les. prom., 13, no. 4, 1953.

9. Monthly List of Russian Accessions, Library of Congress, ___April___ 1953, Uncl.

IONOV, B.D., dotsent.

For a modern technology of log skidding. Les.prom.14 no.4:4-7 Ap '54.
(MLRA 7:4)

1. Moskovskiy lesotekhnicheskiy institut.   (Lumbering)

BUVERT, Viktor Vladimirovich, prof.; IONOV, Boris Dmitriyevich, dotsent,
kand.tekhn.nauk; KISHINSKIY, Mikhail Il'ich, dotsent, kand.tekhn.
nauk; SYROMYATNIKOV, Sergey Arkad'yevich, dotsent, kand.tekhn.
nauk; KORUNOV, M.M., prof., retsenzent; VERIGO, M.F., prof.,
doktor tekhn.nauk, red.; POLTEVA, B.Kh., red.izd-va; BACHURINA,
A.M., tekhn.red.

[Land transportation of timber] Sukhoputnyi transport lesa.
Izd.2., perer. Pod obshchei red. M.F.Verigo. Moskva, Gosles-
bumizdat. Vol.1. 1960. 475 p.   (MIRA 14:4)
         (Lumber--Transportation)

BELOZERTSEV, Vasiliy Yefimovich, kand.tekhn.nauk; KUVSHINSKIY, V.V.,
    inzh., retsenzent; YEPIFANOV, B.Ye., dotsent, kand.tekhn.nauk,
    retsenzent; IONOV, B.D., red.; PITERMAN, Ye.L., red.izd-va;
    PARAKHINA, N.L., tekhn.red.

[Road-building machinery] Dorozhnostroitel'nye mashiny. Moskva,
Goulesbumizdat, 1960. 263 p.   (MIRA 14:3)
        (Road machinery)

YEPIFANOV, Boris Yefimovich, dotsent; IONOV, Boris Dmitriyevich, dotsent;
     KORUNOV, M.M., prof., retsenzent; SHCHELKUNOV, V.V., dotsent,
     retsenzent; SHCHENNIKOV, P.N., dotsent, retsenzent; SMIRNOV,
     A.I., dotsent, red.; PITERMAN, Ye.L., red.izd-va; VDOVINA, V.M.,
     tekhn.red.

[Road-building machinery in the forest industries and principles
of road building] Dorozhno-stroitel'nye mashiny v lesnoi pro-
myshlannosti i osnovy dorozhnogo dela. Moskva, Goslesbumizdat,
1961.. 376 p.   (MIRA 14:12)

1. Ural'skiy lesotekhnicheskiy institut (for Korunov). 2. Arkhan-
gel'skiy lesotekhnicheskiy institut (for Shchelkunov).
     (Road machinery)   (Wood-using industries)

MEL'NIKOV, Valentin Ivanovich, dots., kand. tekhn. nauk; SERGEYEV,
        Petr Georgiyevich, dots., kand. tekhn. nauk; DMITRIYEV,
        Yuriy Yakovlevich, kand. tekhn. nauk; SELIN, K.F., retsen-
        zent; DOIL'NITSINA, A.G., retsenzent; IONOV, B.D., retsen-
        zent; KISHINSKIY, M.I., otv. red.; PLESKO, Ye.P., red. izd-
        va; GRECHISHCHEVA, V.I., tekhn. red.

        [Land transportation of timber and lumber floating]Sukho-
        putnyi lesotransport i lesosplav. Moskva, Goslesbumizdat,
        1962.   314 p.   (MIRA 15:12)

        1. Petrozavodskiy lesotekhnicheskiy tekhnikum (for Ionov).
                (Lumber—Transportation)

IONOV, B.I.; PETROV, N.I., redaktor; KONSTANTINOV, V.P., redaktor; KRAS-
————————NIK, A.K., tekhnicheskiy redaktor

[Practical guide for ship radio operators] Prakticheskoe rudovod-
stvo sudovomu radistu. Izd. 2-e, perer. i dop. Moskva, Izd-vo Mini-
sterstva rechnogo flota SSSR, 1952. 219 p. [Microfilm] (MLRA 8:7)
        (Radio in navigation)

ICNCV, B. V.

Reinforced Concrete Construction

Large-scale reinforced concrete products for Moscow housing construction.   Biul.stroi.
tekh. 9 no. 15, 1952.

9.   Monthly List of Russian Accessions, Library of Congress, ___November___ 195/, Uncl.
                                                                        2

IONOV, F.

IONOV, F.

Roads in the Tatar A.S.S.R. are not maintained. Avt.transp. 32
no.5:37 My '54.   (MLRA 7:7)

1. Upravlyayushchiy Tatarskim avtotrestom "Soyuzzagottrans".
   (Tatar A.S.S.R.--Roads) (Roads--Tatar A.S.S.R.)

VINNIKOV, V., podpolkovnik; IONOV, G., podpolkovnik

Breakthrough from the march. Voen.vest. 39 no.4:30-34 Ap '60.
(MIRA 14:2)

(Attack and defense (Military science))

SEROV, Aleksandr Ivanovich, polkovnik; IONOV, Gleb Aleksandrovich,
    podpolkovnik; DUKACHEV, M.P., polkovnik, red.; BUKOVSKAYA,
    N.A., tekhn.red.

[Teaching defense operations] Obuchenie deistviiam v oboro-
nitel'nom boiu. Moskva, Voen.izd-vo M-va obor.SSSR, 1960.
76 p.   (MIRA 14:4)
       (Attack and defense (Military science))

IONOV, I.F., inzhener; ARSENT'EV, A.N., redaktor.

[Communications and signalling, interlocking and block systems on coal-pit railroads] Sviaz' i STsB na zheleznodorozhnom transporte ugol'nykh kar'erov. Moskva, Ugletekhizdat, 1952. 77 p.

(MLRA 7:3)

(Mine railroads)   (Railroads--Signalling)

LOZOVOY, A. V.; MUSELEVICH, D. L.; RAVIKOVICH, T. M.; TITOVA, T. A.; CHERKASOVA, V. F.; Prinimal uchastiye: IONOV, I. F.

Two-stage system for the hydrogenation method of production of chemicals from Cheremkhovo coal tars. Report No. 2. Trudy IGI 17:174-181 '62.   (MIRA 15:10)

(Coal-tar products)   (Hydrogenation)

ACC NR: AR6018973   SOURCE CODE: UR/0271/66/000/002/B037/B037

AUTHOR: Ionov, I. P.

TITLE: A magnetic shift register using chokes

SOURCE: Ref. zh. Avtomat telemekh i vychisl tekhn, Abs. 2B263

REF SOURCE: Tr. Mosk. energ. in-ta. vyp. 60. no. 3, 1965, 67-82

TOPIC TAGS: shift register, magnetic core

TRANSLATION: The operation of a shift register based on serially connected chokes is analyzed and briefly described. The system realizes inverting codes for even and odd cores. The maximum operational frequency is 250 KHz, limited primarily by the ferrite core properties. The system has a minimum number of components and is easily adjusted. It is noted that for stable operation of this system, large turn ratios in the windings are necessary, which leads to an increase in the demands on power sources. A simple method for system design based on integration without graphic analysis is included. Good agreement between design and experimental data is noted. 2 references, 8 figures. N. P.

SUB CODE: 09

                                        UDC: 681.142.642.7

Card 1/1

IONOV, I.P.; IONKIN, P.A., red.

[Principles of the calculation and design of magnetic
semiconductor elements] Osnovy rascheta i proektirovaniia
magnitno-poluprovodnikovykh elementov. Moskva, Mosk.
energeticheskii in-t, 1965. 276 p.   (MIRA 18:12)

IONOV, I.P.

Magnetic shift register using choke elements. Trudy MEI
no. 60 no. 3:67-82 '65   (MIRA 19:1)

KATSNEL'SON, I.B., dotsent; BESSER, V.L.; IONOV, I.T.; GORYACHIY, M.P.;
    IOFIN, I.I.; CHARTORIZHSKIY, N.A., kand.med.nauk

    Poisoning from castor bean seeds; clinical and experimental observa-
    tions. Sov. med. 24 no. 2:131-135 F '60.   (MIRA 14:2)
             (CASTOR BEAN—TOXICOLOGY)

KAPUSTIN, B.N., glav. inzh.; GVOZDEV, T.T., glav. inzh.; GRIGOROVICH,
     V.D., inzh.; KONDRASHENKO, A.A., inzh.; ABADEYEV, Yu.A., inzh.;
     RYADNOV, A.A., inzh.; YEGORYCHEV, V.P., inzh.; SHMEL'KIN, B.A.,
     inzh.; MARSHUTIN, S.F., inzh.; KHODZHABARONOV, K.G., inzh.;
     FEDOSOVA, Ye.M., tekhnik; OSIN, V.I., tekhnik; SEMENOVA, Ye.P.,
     tekhnik; AVSARAGOVA, G.A., tekhnik; PASHKEYEV, D.A., inzh.;
     KAPUSTIN, V.N., inzh.; NAGOROV, L.A., inzh.; IONOV, I.T., inzh.;
     KOPEYKINA, L.M., inzh.; TELEPNEVA, T.P., tekhnik; CHAKURIN,
     Zh.G., tekhnik

[Album of the mechanization of labor-consuming processes in
stockbreeding] Al'bom mekhanizatsii trudoemkikh protsessov v
zhivotnovodstve. Moskva, Izd-vo Giprosel'khoza. No.4.[Equip-
ment and supplies for the mechanization of labor-consuming
processes on livestock farms] Oborudovanie i inventar' dlia
mekhanizatsii trudoemkikh protsessov na zhivotnovodcheskikh
fermakh. 1959 [cover: 1961. 229] p.   (MIRA 15:7)

1. Gosudarstvennyy institut po proyektirovaniyu sel'skokho-
zyaystvennykh sooruzheniy (for Kapustin, Grigorovich,
Kondrashenko, Abadeyev, Ryadnov, Yegorychev, Shmel'kin,
Marshutin, Khodzhabaronov, Fedosova, Osin, Semenova, Avsara-
gova).

                              (Continued on next card)

KAPUSTIN, B.N.——(continued). Card 2.

2. Respublikanskiy gosudarstvennyy institut po proyektirova-
niyu sovkhoznogo stroitel'stva (for Gvozdev, Pashkeyev,
Kapustin, V.N., Nagorov, Ionov, Kopeykina, Telepneva,
Chakurin).
              (Agricultural machinery)

IONOV, L., insh.

Machine for processing reed. Sel'.stroi. 15 no.8:22
Sel'.stroi. 15 no.8:22 Ag '60.   (MIRA 13:8)
            (Reed (Botany))

IONOV, L., inzhener, izobretatel'

Air-filed framework. Izobr. i rats. no.3:28-29 Mr '61.   (MIRA 14:3)
(Buildings, Portable)

IONOV, L.; LYUTFALIBEKOV, F.

Structure made of mechanical and pneumatic elements. Sel'.
stroi. 16 no.6:14-15 Je '61.   (MIRA 14:7)

1. Nachal'nik byuro sodeystviya ratiohalizataii i izobretatel'-
'stvu Nauchno-issledovatel'skogo instituta sel'skogo stroitel'stva
(for Ionov). 2. Nachal'nik otdela nauchnoy metodiki i informataii
(for Lyutfalibekov).
                         (Buildings, Plastic)

LIPKIN, M.Ye.; KISHKO, Ya.G.; URIN, A.I.; KOLOTILOVA, L.V.; IONOV, L.I.

Use of the fluorescent method for the detection of poliomyelitis
and rabies viruses. Vop. virus. 10 no.1:26-29   Ja-F '65.
(MIRA 18:5)

1. Institut epidemiologii, mikrobiologii i gigiyeny, L'vov.

ACC NR: AP7008877.   SOURCE CODE: UR/0020/66/169/003/0550/0553

AUTHOR: Ionov, L. N.; Akimov, I. A.; Terenin, A. N. (Academician)

ORG: none

TITLE: Photoconductivity of organic dyes at a frequency of 10 sup 10 c

SOURCE: AN SSSR. Doklady, v. 169, no. 3, 1966, 550-553

TOPIC TAGS: dye chemical, photoconductivity, EPR, klystron

SUB CODE: 20

ABSTRACT: The photoconductivity of 11 organic dyes has been studied at ultra-high frequencies by means of an electron paramagnetic resonan radiospectrograph with a transient resonator, described earlier (E. V. Baranov, I. A. Akimov, DAN, 1954, 184, 1964). No use was made of magnetic fields; the dye sample in the form of a 10^{-4}-10^{-3} cm layer was held by a mica disc 5.3 cm in diameter and placed in the region of the maximum electric field within the H_{012}-type cylindrical resonator (Q factor with the sample = 10^{4}). The UHF power generated by a klystron (ν = 9600 Mc, P = 5 mW) passed through the resonator and was registered by a bolometer. The article presents data about the various samples used, the spectral distribution of photoconductivity at UHF of copper polyphenylacetylenide, and curves of temperature dependence of photoconductivity at UHF of a crystalline and amorphous layer of dyes for all 11 dyes used. Ye. K. Putseyko and I. A. Popova supplied the pigment samples, while A. M. Sladkov supplied the polymer. The authors thank V. Ye. Kholmogorov for discussions during the work. Orig. art. has: 2 figures and 1.table. [JPRS: 38,417]

Card 1/1   UDC: 535.215

IONOV, Lev Pavlovich; GORLYSHKOV, Vladimir Pavlovich; LYUTFALIBEKOV,
    Farkhad Ashrafovich; ZHURAVLEV, B.A., red. izd-va;
RODIONOVA, V.M., tekhn. red.

[Rural buildings that can be assembled in a few hours]
Sel'skie postroiki, sobiraemye za neskol'ko chasov. Mo-
skva, Gosstroiizdat, 1962. 78 p.   (MIRA 16:3)
    (Farm buildings) (Buildings, Prefabricated)

IONOV, Lev Pavlovich; GORLYSHKOV, 'ladimir Pavlovich

[Rural structures assembled in a few hours; aid for
the rural builder] Sel'skie postroiki, sobiraemye za
neskol'ko chasov: 'moshch' sel'skomu stroiteliu.
Izd.2., perer. i dop. Moskva, Stroiizdat, 1964. 142 p.
(MIRA 18:1)

IONOV, M.N.

Observations on the dormouse in Bet-Pak-Dala. Izv.AN Kazakh.SSR.
Ser.zool. no.7:124-126 '48.   (MLRA 9:5)
                         (Bet-Pak-Dala--Dormouse)

1. IONOV, M. N.

2. USSR (600)

4. Furniture Industry

7. Put out furniture of exceptional quality. Der.i lesokhim prom 1 no2 - 1952

ROZANTSEV, S.; IONOV, N.

　　Production bases of repair and construction bureaus.　Zhil.-kom.khoz. 3 no.10:
　12-16 O '53.
　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　(MLRA 6:11)
　　　　　　　　　　　　　　　(Building--Repair and reconstruction)

IONOV, N., inzhener.

Fuel syphon. Avt. transp. 35 no.1:34 Ja '57.   (MIRA 10:3)
(Automobiles--Apparatus and supplies)

9(2)

AUTHOR: Ionov, N.A., Technician

SOV/C I-59-9-16/33

TITLE: Copper-Graphite Contacts for Contactors

PERIODICAL: Energetik, 1959, Nr 9, p 24   (USSR)

ABSTRACT: For simplifying the operation of KT a.c. contactors,
                 their stationary metal contacts were replaced by cop-
                 per-graphite brushes having a high copper content.
                 This replacement resulted in less frequent cleaning of
                 the contacts, as compared to the all-metal contacts
                 previously used. Regardless of the high frequency of
                 switching operations, the stationary contacts proved
                 to be stable in mechanical respect. The author sta-
                 tes that the quality of such contacts may be impro-
                 ved, if they were manufactured at electrical equip-
                 ment plants. There is 1 diagram.

Card 1/1

SHESTAKOV, N.F., brigadir ekskavatorshchikov; IONOV, N.A., brigadir
ekskavatorshchikov

Using excavators in cleaning and deepening reservoirs.
Suggested by N.F.Shestakov, N.A.Ionov. Rats.i izobr.predl.v
stroi.   no.11:87-89 '59.   (MIRA 13:3)

1. Leningradskoye upravleniye tresta Gidrospetsmetallurg-
stroy.
                  (Reservoirs)

c A

Formation of negative halogen ions in the interaction of
alkali halides with the surface of incandescent tungsten.
V. M. Dukel'skii and N. I. Ionov. *J. Expl. Theoret.
Phys.* (U. S. S. R.) **10**, 1248-56 (1940).—When mols. of
Na, K, Rb and Cs halides react with a W surface heated to
2800-3000°K., negative ions are produced. From meas-
urements on the positive- and negative-ion currents
(given in 5 tables), the electron affinities of the halogen
atoms are: F, 4.11 e. v.; Cl, 3.71–3.78 e. v.; Br, 3.64
e. v.; I, 3.31 e. v. The app. is described and illustrated by
means of 2 diagrams.
                                         P. H. Rathmann

CA

3

Formation of negative ions in the process of surface ionization of alkali halides on heated tungsten. N. I. Ionov. *Compt. rend. acad. sci. U. R. S. S.* 28, 512-13 (1940)(in English).—A thermodynamic treatment analogous to that followed in the deduction of Langmuir's equation was applied to calc. the probability for a halogen atom evapd. from the metal surface as a neg. ion. The equation found, giving the ratio of the no. of pos. alkali ions ν_+, to the no. of neg. halogen ions ν_- evapg. from the heated surface is $\nu_+/\nu_- = (1 + 4e^{\varphi - S\nu/kT})/(1 + 2e^{I - \varphi \nu/kT})$, where φ is the work function of the surface, I the ionization potential of the alkali atom and S the electron affinity of the halide atom. KCl, RbCl, KBr, RbBr and KI were investigated by directing mol. beams against a heated W filament, then drawing off the ions with an elec. field and counting with a Faraday counter 12 cm. away from the filament. Sepn. of electrons and ions was achieved by a magnetic field. The neg. current thus produced was found to increase markedly with increased temp. of the W filament. By using 4.52 e. v. for φ and the exptl. value for the ratio ν_+/ν_- the following values for electron affinity of halide atoms were obtained: for Cl, $S = 3.71$ and 3.78 e. v. (from KCl and RbCl); for Br, $S = 3.64$ e. v. (from both KBr and RbBr) and for I, $S = 3.31$ e. v. (from KI).

Frank Grunt

No.3,   3

Temperature dependence of the formation of negative iodine ions on the surface of incandescent tungsten. N. I. Ionov (Phys. Inst., Leningrad State Univ.). *J. Exptl. Theoret. Phys.* (U.S.S.R.) 17, 272-7(1947)(in Russian).—The formula $n_-/n_- = (4A/v)T^{\frac{1}{2}}e^{-S_e/kT}$ relating the nos. n_-, v_-, and v of electrons, neg. ions, and neutral atoms, resp., emitted at the temp. T from an incandescent filament in the presence of the vapor of a halogen of electron affinity S, and derived by eliminating, with the aid of Richardson's thermionic emission law (A = Richardson's const., e = elementary charge), the work function from the expression of the probability of surface ionization, was subjected to exptl. test by measurements of the electronic (i_e) and of the ionic (i_-) contributions to the current intensity, the measured ratio i_-/i_e being tantamount to n_-/n_-. The sepn. of i_e and i_- was obtained in a magnetron tube by screening the electrons with the aid of the magnetic field of a coil coaxial with the W filament, of diam. 0.12 mm., 85 mm. long; with 3 coaxial Ta cylinders the middle one of which (diam. 42 mm., length 65 mm.) served as the measuring anode, and a Mo grid 12 mm. in diam. and 40 mm. long, with protective rings 20 mm. long, at an anode-cathode potential of 9 v. and a grid potential of 10 v., a field of 100 gausses reduced the anode current 10^3-10^5 times, owing to the large surface area of the grid. After evacuation to 10^{-8} mm. Hg, an ampul filled with iodine was crushed; the temp. was kept at below 0°. Perfect linearity of plots of log $(i_-/T^{\frac{1}{2}}i_e)$ against $1/T$, from $T = 1800°$K. to 2330°K., under iodine pressures of 1×10^{-3} and 0.3×10^{-3} mm. Hg, confirmed the validity of the formula derived. From the slope of the straight lines, $S = 3.1$ v.   N. Thon

Energy distribution of the positive ions of potassium formed in surface ionization on tungsten. N. I. Ionov (Leningrad Phys. Tech. Inst.). *J. Exptl. Theoret. Phys.* (U.S.S.R.) 18, 96–100(1948)(in Russian); cf. *C.A.* 42, 5757h.—The Maxwellian character of the initial energy distribution of K^+ ions formed from K, KCl, and KBr on W between 1300 and 2400°K. is demonstrated by the inapplicability of the exponential relation between the intensity of the ion current i and the stopping potential difference V between the wire and the collector in a cylindrical condenser, $i = i_0 e^{-V_0/kT}$ (where i_0 = satn. current, e = elementary charge), valid for thermal electron emission. Log i/i_0 is a linear function of V, the slopes being the same for K, KCl, KBr, and for electrons at the same temp., and diminishing with rising temp. of the W wire. The temps. obtained from the slopes are higher than those detd. by the incandescence current. At 2050°K., i_0 for the pos. ions and for electrons are about equal; the i log i/i_0 (V) lines are practically parallel.　　　　N. Thon

PROCAINES AND PROPERTIES INDEX

Mass-spectrometric investigation of the formation of negative halogen ions in the interaction between halides and the surface of incandescent tungsten. N. I. Ionov. (Leningrad Phys. Tech. Inst.). *J. Exptl. Theoret. Phys.* (U.S.S.R.) 18, 174-86(1948)(in Russian); cf. *C.A.* 42, 815d.—(1) The intensity $I^- = \nu_-/\nu$ (ratio of the no. of neg. ions leaving the hot W surface and the no. of neutral atoms impinging thereon) was detd. in a mass spectrograph, indicating masses between 5 and 300, on mol. beams of NaCl, KCl, RbCl, CsCl, KBr, KI, and KF, as a function of the temp. T of the W wire, and compared with the formula $\nu_-/\nu = (1 + 4e(\varphi - S)\epsilon/kT)^{-1}$ (where φ = work function of the surface, e = elementary charge, $-S$ = electron affinity of the neg. ion), analogous to the Saha-Langmuir expression for pos. ionization, $\nu_+/\nu = (1 + 2e(I - \varphi)\epsilon/kT)^{-1}$ (I = ionization potential of the pos. ion). The quotient ν_+/ν_- permits exptl. detn. of the electron affinity of the halogens. Results are plotted in the form $\log I^-$ against $10^3/T$. The relation is linear at temps. above 2300°K.; below that temp., I^- decreases with decreasing temp. faster than linearly (except in the case of K^-); this indicates that φ is raised owing to adsorption of neg. ions on W; this is also shown by the hysteresis effects observed below 2300° on rapid changes of the temp. The $(\varphi - S)$ values derived from the exptl. slopes of the rectilinear portions of the $\log I^-(10^3/T)$ graphs coincide satisfactorily with those obtained from ν_+/ν_-; if φ is taken = 4.54 e.v., one finds for the values of S: Cl 3.7, Br 3.34, I 3.12, with a possible error of ±0.10 e.v. These values are considered more reliable than those found previously

(Dukelskii and I., *C.A.* 35, 5387[2]). Absence of a direct detn. of φ for W in KF vapor under the same conditions prevents evaluation of an accurate S value for F; if φ is taken = 4.93, from the thermoelectronic emission of W in KF vapor (*l.c.*), one finds for F, S = 4.0 e.v. (2) The $\log I^-(10^3/T)$ curve for WCl₆ has the same shape as for the alkali metal halides; this indicates the same process of formation of neg. ions. (3) In ThCl₄ one observes, beside Cl⁻ ions, also a max. corresponding to the neg. mol. ion Cl₂⁻. The intensity of Cl⁻ reaches a max. at about 2000°K. and decreases somewhat with further rising temp.; the intensity of Cl₂⁻, after passing through the max., falls very rapidly with rising temp. The lower limit of S for Cl₂⁻, unobtainable by the Born cycle owing to the unknown energy of dissocn. Cl₂⁻ → Cl + Cl⁻, can be estd. from the ratio $I^-(Cl)/I^-(Cl_2^-)$ (=60) at 2000°K.), on the assumption that, at that temp., the W surface is covered with a layer of Th thicker than monoatomic, that is, that the φ involved is that of pure Th = 3.38 e.v.; further, that at 2000°K., where both $I^-(Cl^-)$ and $I^-(Cl_2^-)$ are max., the probabilities of formation of Cl⁻ and of Cl₂⁻ are equal. On these assumptions, $S(Cl_2)$ = 3.7 e.v. This is consistent with the postulate that S for Cl₂ should be lower than for Cl (3.7) because of the pos. sign of the energy of dissocn. Cl₂⁻ → Cl + Cl⁻. The assumption of thick coverage of the W surface with Th, at 2000°, is substantiated by an estn. of the no. of Th atoms arriving at the surface, $10^{14}-10^{15}$/sq. cm./sec., as against the 1.5×10^9 atoms/sq. cm./sec. evapg. from the surface.   N. Thon

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

3

USSR/Physics
    Ionization
    Electrons

21 Jan 1948

"Ionization of Molecules II, NaI and CsCl by Electrons," I. I. Ioner, Leningrad Physicotech Inst, Acad Sci USSR, 2½ pp Leningrad

"Dok Akad Nauk SSSR, Nova Ser" Vol LIX, No 3 p. 467-9

Describes results of experiments on ionization of bundles of molecules of alkali-haloid salts by electrons. Dependence of the intensity of mass lines upon change in density of the molecular bundles over large interval of change in density showed that all positive ions observed in ionization of molecules of

USSR/Physics (Cont'd)

21 Jan 1948

the salts were formed by elementary acts, and the influence of secondary processes were not observed in the experiments. Submitted by Academician A. F. Ioffe, 20 Nov 1947.

IONOV, N. I.   Sep 48

USSR/Chemistry - Ions, Electrolytic,
                 Mass of
     Chemistry - Alkali Metal Salts

"Negative Ions of Alkali Metals in Gas Discharges Occurring in Vapors of Alkali-Haloid
Salts," V. M. Dukel'skiy, E. Ya. Zandberg, N. I. Ionov, Leningrad Physicotech Inst
imeni P. N. Lebedev, Acad Sci USSR, 2 pp

"Dok Ak Nauk SSSR" Vol LXII, No 3

Introduces results of preliminary experiments investigating composition of ions which
form in a gaseous discharge in vapors of the alkali-haloid salts LiCl, NaI, and KI'
Established the existence of negative ions of Li, Cl, and I and that their concentration
in the discharge was large enough to enable easy discovery and measurement (mass).
Submitted by Acad A. F. Ioffe, 14 Jul 48

PA 36/49T15

IONOV, N. I.

USSR/Physics - Ions   Sep 49
     Mass-Spectrography

"Negative Ions of Rubidium and Cesium," V. M. Dukel'skiy, E. Ya. Zandberg,
N. I. Ionov, Leningrad Physicotech Inst, Acad Sci USSR, 2pp.

"Dok Ak Nauk SSSR" Vol LXVIII, No 1.

Used a low-pressure discharge in vapors of RbCl and CsCl as an ion source.
Ions were drawn from discharge in a vacuum, accelerated to an energy
of 1,350 ev, and anlyzed with a magnetic mass-spectrograph with a
calculated resolving power of about 100. Ionic currents were measured
with a vacuum-tube electrometer having sensitivity of approx $6 \cdot 10^{-14}$
amp per scale division. Discovery of negatice Rb and C_s ions shows that
atoms of all alkali metals have electron affinity. Submitted by Acad.
A. F. Ioffe 6 Jul 49.

PA 2/50T103

IONOV N. I.

USSR/ Physics Discharge Ions, Negative

Oct 50

"Negative Ions in a Gaseous Discharge in Vapors of Halide Salts of Alkali and Alkali-Earth Metals," V. M. Dukel'skiy, E. Ya. Zandberg, N. I. Ionov, Leningrad Physicotech Inst, Acad Sci USSR.

"Zhur Eksper i Teoret Fiz" Vol XX, No 10, pp 877-885.

Mass-spectroscopic analysis of composition of negative ions occurring in gaseous discharges in vapors of subject salts: Establishes existence of Li^-, Na^-, K^-, Rb^-, Cs^-, Ions Mg and Ca, in discharges in vapors of $MgCl_2$ and $CaCl_2$ are not observed Molecular negative ions of type MeX^- and MeX_2^- are observed in the case of alkali halide salts, and ions of type MeX^-, MeX_2^-, and MeX_3^- for $CaCl_2$ and $MgCl_2$ also are observed Negative atomic ions of Ag are observed in discharges in vapors of AgI. Submitted 7 Mar 50

PA 169T93

IONOV, N. I.

USSR/Physics - Ions of Metals,   11 Dec 51
                    Negative

"Negative Ions of Selenium, Tellurium, Antimony,
and Bismuth," V. M. Dukel'skiy and N. I. Ionov,
Leningrad Phys-Tech Inst, Acad Sci USSR

"Dok Ak Nauk SSSR" Vol LXXXI, No 5, pp 767-769

Establishes that neg ions of subject metals, which
had not been known up to this time, actually do
exist. Investigates the arc discharge in the va-
por of the metal. Demonstrates the possibility of
the formation of neg ions by heavy metal atoms.
Submitted by Acad A. F. Ioffe 16 Oct 51.

                                        210T94

PA 227T77

IONOV, N. I.

USSR/Physics - Plasma of Gaseous   1 Aug 52
                Discharge

"Measuring the Electrons and Positive Ions in the
Plasma of Gaseous Discharge," N. I. Ionov, Lenin-
grad Phys-Tech Inst, Acad Sci USSR

"Dok Ak Nauk SSSR" Vol 85, No 4, pp 753-755

Describes attempts to utilize, for the detn of
plasma parameters, probes which consist of 2 elec-
trodes (grids and collector plates), thus ensuring
sep measurement of the electron current and current
of pos ions arriving at the collector. Finds the
energy distribution of the pos ions in the plasma.
Submitted by Acad P.I. Lukirskiy 3 Jun 52.   227T77

IONOV, N. I.

USSR.

A resonance magnetic mass spectrometer with a high resolving power. N. I. Ionov, B. A. Mamyrin, and V. B. Fiks. Zhur. Tekh. Fiz. 23, 2104-6(1953).—A resonance magnetic mass spectrometer is described which has an increased current intensity and whose resolving power can be changed without discontinuity.   J. Rovtar Leach

Fоноv, N.I.

USSR/ Chemistry - Physical chemistry

Card 1/1   Pub. 22 - 36/63

Authors   : Bakulina, I.N., and Ionov, N.I.

Title   : The energy of electron affinity of Cy determined by the method of surface ionization of KCN and KCNS molecules

Periodical : Dok. AN SSSR 99/6, 1023-1024, Dec 21, 1954

Abstract   : The surface ionization of potassium thiocyanate (KCNS) and potassium cyanide (KCN) molecules on incandescent W was investigated. During the analysis of spectra of the positive and negative ions formed during surface ionization of KCN and KCNS molecules, the authors discovered positive ions of K39 and K41 isotopes, as well as negative ions with a mass 26. It was esteblished that the magnitude of the energy of the electron cyan affinity is not lower than 3 ev and that its values, at high filament temperatures, were very close to actual. The negative ions with mass 32, discovered during ionization of KCNS, were found to be the ions of the most widely known S32 isotope. Two references; 1-USA and 1-USSR (1948-and 1952). Table.

Institution: Academy of Sciences USSR, The Physico-Technical Institute, Leningrad

Presented by: Academician A.N. Terenin, July 12, 1954

IONOV — N. I.

6

Energy of the electron affinity of the halogen atoms. I. N. Bakulina and N. I. Ionov (Phys.-Tech. Inst., Leningrad). *Doklady Akad. Nauk S.S.S.R.* 105, 680–2(1955).— The electron affinity of F, Cl, Br, and I atoms was detd. by the Saha-Langmuir formula for the surface ionization of alk. halide salts. The difficulty with that formula is its inclusion of ϕ the (Richardson) work function, which can be detd. only indirectly. A modification of that formula that does not contain ϕ, is used to calc. the 6 possible combinations of the difference, $S_i - S_i$ in electron affinity of 2 halogens. These 6 differences (expressed in e.v.) are: $S_{Cl} - S_I = 0.48 \pm 0.03$, $S_{Cl} - S_{Br} = 0.21 \pm 0.06$, $S_{Cl} - S_F = 0.21 \pm 0.03$, $S_{Br} - S_I = 0.27 \pm 0.02$, $S_{Br} - S_F = 0.03 \pm 0.02$, $S_F - S_I = 0.24 \pm 0.04$. In the absence of a sufficiently accurately known value for any one halogen atom, a provisional value of 3.6 is assumed for Br, i.e., $S_{Br} = 3.6$ e.v., and this, combined with the above difference values, yields: $S_{Cl} = 3.8$, $S_I = 3.3$, and $S_F = 3.6$ e.v.   V. H. G.
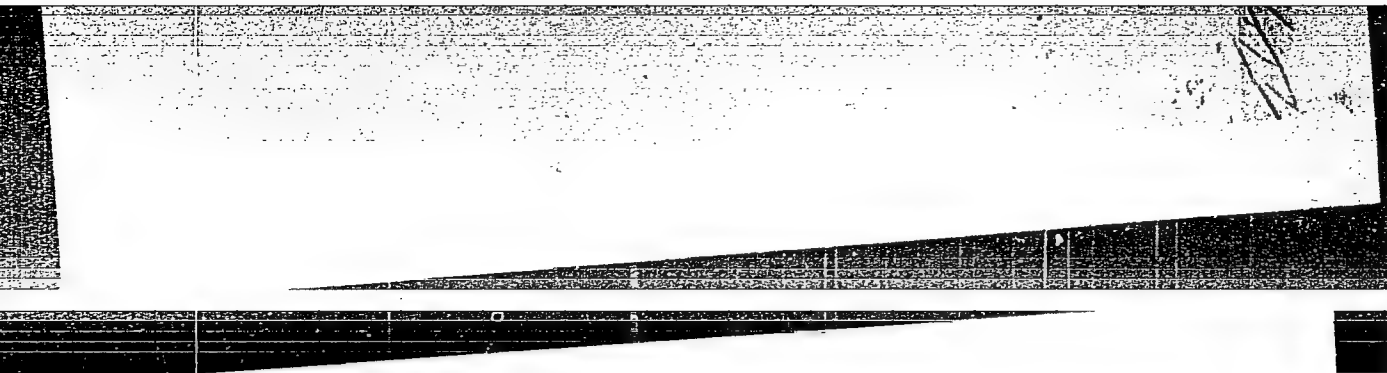
IONOV, N.I.

CARD 1 / 2   PA - 1580

SUBJECT   USSR / PHYSICS
AUTHOR   IONOV,N.I.
TITLE   The Surface Ionization of the Molecules of Potassium Chloride and
               Cesium Chloride in an Electric Field.
PERIODICAL   Zurn.techn.fis,26, fasc.10, 2200-2203 (1956)
               Issued: 11 / 1956

Some years ago the author carried out comparative measurements of the tempera-
ture dependence of the current of potassium ions produced on the occasion of
the surface ionization of potassium atoms and of molecules of all halide in
tungsten in order to discover the influence exercised by the chemical potassium
ion compounds on surface ionization. The effective pressure in the bundle was
from 10^{-6} to 10^{-7} torr. The dependences found are shown in a diagram. It is
interesting to note the absence of a noticeable influence exercised by the
chemical compound of the potassium atoms on the course of the temperature de-
pendence of the flux of positive ions. The slight increase of amperage on the
occasion of the ionization of molecules as compared with the amperages of
potassium atoms in the temperature interval of from 1200 to 1800° K can be
explained by an increase of the output work of tungsten as a result of ab-
sorption of the halide in the surface. At temperatures of the wire below 1200°
all curves have the same shape. According to S.V.STARODUBCEV a thermal dis-
sociation of a certain part of the impinging salt molecules in alkali and
halide atoms takes place. The surface of the heated tungsten acts catalyti-
cally on the dissociation of the salt molecules. Furthermore, the decrease of

Zurn.techn.fis,26, fasc.10, 2200-2203 (1956) CARD 2 / 2   PA - 1580

amperage on the occasion of an increase of temperature beyond 1200° K tends to show that the salt molecules which are in temperature equilibrium with the surface are rather highly ionized. The modification of evaporation heat "adatoms" (evaporation on the surface) in the case of a constant number of molecules impinging upon the surface per second shifts the low temperature range of the ionization curve. In the case of surface ionization the evaporation heat of the "adatoms" contains the work performed against the polarization forces. This work is diminished in an exterior electric field and consequently the temperature threshold of surface ionization must depend on the field strength on the surface. In order to confirm this assumption tests of surface ionization mentioned in the above title were carried out. The shape of the electrodes is described. Test results are shown in a diagram. It was found that the temperature threshold of surface ionization shifts considerably towards lower anode temperatures in the case of an increasing potential difference between anode and grid. In the particularly thin tungsten band marked ionization emission was noticed already at 50° C. This shifting of the temperature threshold can be explained on the basis of the ideas developed by DOBRECOV.

INSTITUTION: Leningrad Physical-Technical Institute of the Academy of Science
                  in the USSR.

IONOV, N.I.

IONOV, N.I.; KARATAYEV, V.I.

Mass analyzer for the rapid determination of isotopic components of alkaline and alkali earth metals. Zav. lab. 23 no.5:621-624 '57.

(MIRA 10:8)

1. Leningradskiy fiziko-tekhnicheskiy institut Akademii nauk SSSR.
(Mass spectrometry)   (Isotopes)

IoNOV, N. I.

20-1-11/44

AUTHORS: Bakulina, I.N., Ionov, N.I.

TITLE: Determination of the Energy of Electronic Affinity of Sulphur Atoms by Means of the Method of Surface Ionization (Opredele-niye energii elektronnogo srodstva atomov sery metodom pover-khnostnoy ionizatsii)

ABSTRACT: The experiments described by the present paper permit a very reliable determination of the energy of the electronic affini-ty of sulphur atoms. The authors determined the difference of the energies between electronic affinity of bromine atoms and sulphur atoms by studying the surface ionization of the mole-cules of sodium bromides (NaBr) and sodium sulphites (Na_2S). For this purpose bundles of NaBr-molecules and Na_2S molecules taken from two independent platinum furnaces were directed on-to a tungsten wire   heated up to a temperature T. The posi-tive and negative ions formed on the wire were analyzed by means of a magnetic sector mass spectrometer. During ionization of NaBr and Na_2S ions only Na^+ ions are observed in the spec-trum of the positive ions, and Br^- ions and S^- ions in the

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20-1-**11/44**

Determination of the Energy of Electronic Affinity of Sulphur Atoms by Means of the Method of Surface Ionization

spectrum of the negative ions. The method used for measurements is discussed in short. This method does not give absolute values for the energy of electronic affinity. As a result of their experiments the authors give the value $s_2 = 2,37$ eV for the energy of the electronic affinity of the sulphur atoms. This value agrees with the value $s_2 > 2,2$ eV found by ionization of SO_2 molecules by means of an electron collision. A recently undertaken determination of the energy (by means of the method of photo ionization of the electrons from negative S^- ions) resulted in the value $s_2 = 2,07 \pm 0,07$ eV. The deviation of this value from the value found here may indicate that the energy of the electronic affinity of the bromine atoms is less than 3,6 eV. There are 1 figure and 5 references, 3 of which are Slavic.

ASSOCIATION: Physico-Technical Institute AS USSR (Fiziko-tekhnicheskiy institut Akademii nauk SSSR)

PRESENTED: April 27, 1957, by A.A. Lebedev, Academician
SUBMITTED: April 23, 1957
AVAILABLE: Library of Congress

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IONOV, N.I.

16

SOV/109-4-4-24/24

AUTHORS: Vasil'yev, G.F., Politova, N.N., Shabel'nikova, A.E., Pervova, L.Ya. and Yasnopol'skaya, A.A.

TITLE: Interdepartmental Seminar on Cathode Electronics (The 11th Meeting) (Mezhduvedomstvennyy seminar po katodnoy elektronike) (11-e zasedaniye)

PERIODICAL: Radiotekhnika i elektronika, 1959, Vol 4, Nr 4, pp 731 - 732 (USSR)

ABSTRACT: A meeting of the seminar took place on December 1, 1958 at the Institut radiotekhniki i elektroniki AN SSSR (Institute of Radio-engineering and Electronics of the Ac.Sc.USSR). During the meeting 8 papers were read. Yu.G. Ptushinskiy read a paper entitled: "Kinetics of the Adsorption of Oxygen on the Surface of Tungsten". The second paper, by I.M. Dykman and S.M. Pekar, dealt with "The Admixture Photo-effect of Semiconductors in the Region of the Exciton Light Absorption". The paper by T.L. Matskevich was devoted to "The Problem of the Secondary Electron Emission of Fine Films of a Number of Organic Substances". The problem of "Surface Ionisation in a Strong Electric Field on a Surface with a Non-homogeneous Work Function" was considered by B.Ya. Zandberg and N.I. Ionov. I.M. Bakulina and N.I. Ionov read a paper entitled "Determination of the electron Attachment Energy and of the Potentials of Atoms by the Method of Surface Ionisation". N.L. Yasnopol'skiy and A.P. Alekseyeva dealt with the problem of "Passage of Steady-state Currents Through a Dielectric When the Current Carriers Are Introduced Through One of the Contacts by Means of Electron Bombardment". The lecture by B.A. Semichev and K.G. Uikin discussed the following – "The Possibility of the Analysis of the Total-energy Distribution of Electrons in a Quasi-spherical Condenser". The work by N.L. Kapitsa, B.A. Pridrikhov and A.R. Shul'man dealt with 'An Investigation of the secondary electron emission and the characteristic energy losses of a number of dielectrics (glass, mica, fluorite and alkali-haloid monocrystals).

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SOV/57-58-8-27/37

AUTHORS: Agishev, Ye. I., Ionov, N. I.

TITLE: Mass Spectrometer With a Pulsed Ion Source (Mass-spektroskop s impul'snym istochnikom ionov)

PERIODICAL: Zhurnal tekhnicheskoy fiziki, 1958, 28, Nr 8, pp. 1775 - 1788 (USSR)

ABSTRACT: Since the present work is a continuation of that reported in reference 1 problems bearing upon the resolution and the intensity of the mass spectrograph are approached in this paper. Further experiments carried out with test mass spectrographs in the laboratory are described. These experiments furnished the design data for industrial equipment similar to the series of test apparatus. The evidence advanced provides the following information of the particular features of the pulsed mass spectrograph: 1) The resolution of the spectrograph can be raised to values as high as several hundreds. The resolution is basically limited by difficulties arising in the design of an amplifier with a sufficient amplification factor and a band width of the order of 100 mc. 2) The intensity of this apparatus operating with an ion-focusing source is higher than that

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SOV/57-58-8-27/37

Mass Spectrometer With a Pulsed Ion Source

of magnetic mass spectrographs with the same resolution. This is due to the fact that practically no limitations are imposed on the diameter of the aperture of the ion source in mass spectroscopes. 3) On account of the direction and velocity focusing it is possible to analyze the ions being formed in the ionization chamber. Thus the intensity of light is increased and it is possible to investigate ionization processes with a small probability (for example the photoionization of gases). 4) When the accelerating potentials U_1 are small the resolution is determined from the initial energy distribution of the ions. Hence, the mass spectroscope can be used in the measurement of the width of the mass-peaks of the source energies of split-off ions. A knowledge of the initial energies is highly important in the investigation of the binding energies of atoms in molecules. 5) The oscillograph permits to localize simultaneously the whole mass spectrum of the gas under investigation corresponding to one definite moment of ionization. 6) The modifications of the gas composition in the ionization chamber in principle can be located by the pulse sequence of the ionizing pulses of the electron current which in the de-

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Mass Spectrometer With a Pulsed Ion Source

scribed equipment is 10^{-4} sec. This particular feature of the device is of importance in the study of the time course of various processes. The Scientific Superior Collaborators E. Ya. Zandberg and B. A. Mamyrin assisted in the construction of the test mass spectroscopes. There are 8 figures and 5 references, 4 of which are Soviet.

ASSOCIATION: Leningradskiy fiziko-tekhnicheskiy institut AN SSSR (Leningrad Physical and Technical Institute, AS USSR)

SUBMITTED: July 10, 1957

Card 3/3

ZANDBERG, E.Ya.; IONOV, N.I.

Surface ionization of lithium ions on the polycrystalline tungsten in electric fields up to 1.3×10^6 volts cm. Zhur. tekh. fiz. 28 no.11:2444-2454 N '58.   (MIRA 12:1)
    (Lithium chloride)   (Ionization)

SOV/76-33-9-28/37

5(4)
AUTHORS: Bakulina, I. N.; Ionov, N. I.

TITLE: Determination of the Electron Affinity of Halogen- and Sulphur Atoms as Well as of the CN-Radical by the Method of Surface Ionization

PERIODICAL: Zhurnal fizicheskoy khimii, 1959, Vol 33, Nr 9, pp 2o63 - 2o72 (USSR)

ABSTRACT: Due to the lack of reliable methods of determination, an accurate theoretical calculation of the electron affinity (s) has hitherto been made only for hydrogen, while for all other elements various methods of extrapolation were employed. Direct experimental methods of determining (s) probably are the most reliable ones. One of the first of its kind is the method of surface ionization (SI) which may be used for the determination of (s) of most atoms in which (s) is a positive value. However, this method has also some disadvantages which are to be taken into account. Some values are given which were obtained for the $s(X)$ (Refs 2,3) by various direct experimental methods (Table 1). In the present case, the (SI)-method was used for a determination of the difference $s_1 - s_2$ of two

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Determination of the Electron Affinity of Halogen-   SOV/76-33-9-28/37
and Sulphur Atoms as Well as of the CN-Radical by the Method of Surface Ioni-
zation

negative ions with the application of equations which avoided
the above disadvantages and yielded more accurate results. The
ionic current was measured on a mass spectrograph (Fig 1) and an
EMU-3 electrometer. The values of $s_1 - s_2$ for all halogens
(Table 2) are independent   on   temperature of the tungsten fila-
ment of the ionic source within the temperature range under
investigation (1750-2230°K). The value of (s) for fluorine is
smaller than that for chlorine, i.e. contrary to expectation,
there is no uniform increase in the (s) of the halogens with a
decrease of the atomic number. Determination of (s) for the
sulphur atom, which was equally made by measuring the negative
ionic current, yielded a value of 1.23 ± 0.05 ev with the ob-
servation of   independence on the temperature of the tungsten
filament (Table 4). Further, the authors determined the (s) of
the CN and examined the applicability of the method of (s)-
determination for radicals. Finally, preliminary qualitative
experiments were made to investigate the (SI) of Se and Te on
tungsten, as well as of Sb and As on thorium-oxide cathodes
Card 2/3   (TOC) (with a molybdenum core). In this connection, the authors

Determination of the Electron Affinity of Halogen-   SOV/76-33-9-28/37
and Sulphur Atoms as Well as of the CN-Radical by the Method of Surface
Ionization

investigated the self-emission of the negative ions of (TOC)
and found that the (SI) on (TOC) may be employed for the
preparation of effective sources of negative ions of electro-
negative elements. There are 2 figures, 4 tables, and 22
references, 8 of which are Soviet.

ASSOCIATION: Akademiya nauk SSSR Fiziko-tekhnicheskiy institut, Leningrad
(Academy of Sciences of the USSR, Leningrad, Physical-technical
Institute)

SUBMITTED: March 1o, 1958

Card 3/3

SOV/56-36-4-5/70

21(1)
AUTHORS:

Bakulina, I. N., Ionov, N. I.

TITLE:

Determination of the Ionization Potential of Uranium Atoms by the Method of Surface Ionization (Opredeleniye potentsiala ionizatsii atomov urana metodom poverkhnostnoy ionizatsii)

PERIODICAL:

ABSTRACT:

In the present paper the authors describe a method of determining the ionization potential differences of two arbitrary elements which were ionized simultaneously on a heated metallic surface (tungsten or tantalum). The authors had already employed this method (Ref 1). In the introduction, the theoretical bases of the method are discussed, and for the ion current the formula
$$I = \varepsilon n A^* \exp\left[(\varphi^* + \sqrt{\varepsilon E} - V)\, \varepsilon/kT\right]$$ is given.
(ε = electron charge, n = number of atoms impinging per second on the surface, T = surface temperature, A^* = a function weakly dependent on T, into which there also enters the statistical sum of ion and atom). In the following chapter the measuring method is discussed; Figure 1 is a systematic representation

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Determination of the Ionization Potential of Uranium Atoms by the Method of
Surface Ionization

of the experimental arrangement. The substances, on which
surface ionization was investigated, were mounted on tungsten-
or tantalum filaments and served as ion sources of the mass
spectrometer. No pure metals, but the salts NaCl, LiCl, LiF,
UCl_4, and UF_4 were investigated. Measurements were carried out
according to two methods: either the ion current of F^- in
$LiF-UF_4$ and Cl^- respectively in NaCl-LiCl or $LiCl-UCl_4$ were
measured, or only the dependence of the positive ion current
on T, and the diagram $\lg(I_1/I_2) = f(1/T)$ was made. Filament
temperature in all cases was $2250^\circ K$ for tantalum and $2650^\circ K$
for tungsten base. The apparatus and the method had been checked
by means of ΔV-measurement of sodium- and lithium atoms, the
ionization potential of which is well known. Measuring results
are given in form of diagrams. Figure 2 shows
$\lg(I_T/I_{2250}) = f(1/T)$ for the ionization of Li and Na on
tantalum (straight line in the interval 1700 - $2375^\circ K$). An
arithmetic mean of 85 measurements resulted in $V_{Li} - V_{Na} =$

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SOV/56-36-4-5/70

Determination of the Ionization Potential of Uranium Atoms by the Method of Surface Ionization

0.25 ± 0.02 v according to the first method; according to the second (Fig 3) averaging within the same temperature range (diagram $\lg(I_1/I_2) = f(1/T)$) with respect to 10 series of measurements resulted in: $V_{Li} - V_{Na} = 0.26 \pm 0.05$ v. Figure 4 shows $\lg(I_T/I_{2650}) = f(1/T)$ for ionization of LiF and UF_4 in tungsten in the temperature interval of $2100 - 2800°K$, and figure 5 shows $\lg(I_{Li}/I_U) = f(1/T)$; from the slope of the curve (straight line) the difference $V_U - V_{Li}$ may be determined as 0.68 ± 0.08 v. Thus, $V_U = 5.40 + 0.68 = 6.08 \pm 0.08$ v

results for the ionization potential of uranium atoms. The accuracy of temperature measurement by means of an optical pyrometer amounted to $2 + 3\%$. There are 5 figures and 4 Soviet references.

ASSOCIATION: Leningradskiy fiziko-tekhnicheskiy institut Akademii nauk SSSR
Card 3/4   (Leningrad Physico-Technical Institute of the Academy of Sciences)

SOV/53-67-4-2/7

28(8)
AUTHORS: Zandberg, E. Ya., Ionov, N. I.

TITLE: Surface Ionization (Poverkhnostnaya ionizatsiya)

PERIODICAL: Uspekhi fizicheskikh nauk, 1959, Vol 67, Nr 4, pp 581-623 (USSR)

ABSTRACT: The authors give a survey of the phenomena of surface ioniza-
tion taking special account of the theory. The following
subjects are dealt with by the individual parts: I. Surface
ionization with formation of positive ions in general represen-
tation; 1) emission formulas for a homogeneous surface with-
out electric field, 2) emission formulas for a homogeneous
surface with electric field, 3) surface ionization of atoms
on semiconductors, 4) emission formulas for an inhomogeneous
surface, 5) thresholds in the temperature-dependence of the
surface ionization current. In part II the results obtained
by a number of experimental works on positive surface ioniza-
tion are compiled. Individual chapters deal with the following
subjects: 6) The methods of investigating positive surface
ionization. 7) The positive surface ionization of Cs-, Rb-,
and K-atoms on tungsten in weak electric fields. 8) The positive
surface ionization of Na- and Li-atoms on tungsten in weak
fields. 9) The positive surface ionization of alkali-halide

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Surface Ionization   SOV/53-67-4-2/7

salts on tungsten weak fields. 10) The positive surface ioniza-
tion of alkali metal atoms and molecules of alkali-halide
salts on platinum in weak fields. 11) The surface ionization
of other elements and other compounds in weak fields (on
tungsten). 12) The investigation of the energy distribution
of positive ions (Fig 14). 13) The positive surface ionization
in electric fields (10^4 v/cm). 14) The determination of the
isothermal evaporation heats of ions and atoms on the surface.
15) Measurement of the ionization coefficient of K- and W-atoms.
In part III of the paper the surface ionization with formation
of negative ions is discussed in short. Individual chapters
deal with the following: 16) The negative surface ionization
on homogeneous surfaces. 17) Negative surface ionization on
spotted surfaces. 18) Discussion of investigation methods.
19) Measurement of the temperature dependence of the negative
ion current (Figs 21-23). 20) Determination of the energy of
affinity to the electron by the method of negative surface
ionization (Tables 1 and 2). - The paper gives a detailed
description of the problems, methods, and results connected
with the phenomena of surface ionization. The material was
obtained solely from published works. The paper is of great
value for scientists dealing with these problems on account
Card 2/3   of its clearness, its wealth of material, and its comprehensive

Surface Ionization   SOV/53-67-4-2/7

account of publications. There are 23 figures, 2 tables, and 113 references, 66 of which are Soviet.

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GAPANOV, Viktor Ivanovich; IONOV, N.I., prof., retsenzent; NILENDER, R.A., prof., retsenzent; TSAREV, B.M., prof., retsenzent; BRAGINSKIY, V.B., red.; MURASHOVA, N.Ya., tekhn.red.

[Electronics] Elektronika. Moskva, Gos.izd-vo fiziko-matem. lit-ry. Pt.1. [Physical principles] Fizicheskie osnovy. 1960. 516 p. (MIRA 14:3)

(Electronics)

24.6700,24.7000

77315
SOV/57-30-2-12/18

AUTHORS: Belyakov, Yu. I., Ionov, N. I.

TITLE: Investigations of Hydrogen and Deuterium Desorption
From Palladium by Means of a Pulse Mass Spectroscope

PERIODICAL: Zhurnal tekhnicheskoy fiziki, 1960, Vol 30, Nr 2,
pp 216-222 (USSR)

ABSTRACT: It is of general interest to compare the composition of
desorbed gases with the composition of the initial
material. In the case of the system hydrogen-palladium
the authors tried to answer the question about the
possibility of creating H radicals and positive and
negative ions, together with initial H_2 molecules.
There exist conflicting reports on this subject in the
scientific literature and the authors used, therefore,
a time-of-flight (pulse) mass spectrometer to investi-
gate the desorbed particles after permeation of hydrogen
through palladium. They also analyzed the equimolecular
mixture of hydrogen and deuterium crossing the heated

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Investigations of Hydrogen and Deuterium
Desorption From Palladium by Means of a
Pulse Mass Spectroscope

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SOV/57-30-2-12/18

palladium membrane. The mass spectroscope was described earlier by Agishev and Ionov (ZhTF, XXVI, 203, 1956, ZhTF, XXVIII, 1775, 1958). The source shown on Fig. 1 contained a rectangular window on the electrode 1, covered by a 24 x 21 mm^2 palladium membrane 0.12 mm thick. Electrodes 2 and 3 were 22 mm in diameter and consisted of transparent grids. Tube C was connected through a covar junction O to the glass tube. The membrane could be heated up to 750° C by means of the heater H, and a platinum-platinorhodium thermocouple, T, supplied the temperature. Tube M was a bypass for the hydrogen gas. An electron beam was formed from the cathode K by means of electrodes Z and A, and ended on the collector C. An oil diffusion pump TsVL-100 with a vapor trap reduced the pressure to $1 \cdot 10^{-7}$ mm Hg. The authors first worked without an electron beam and observed significant ion currents of K^+ and Na^+, and also considerable peaks of Rb^+ and Cs^+. These elements are always present in small quantities in palladium.

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Investigations of Hydrogen and Deuterium   77315
Desorption From Palladium by Means of a   SOV/57-30-2-12/18
Pulse Mass Spectroscope
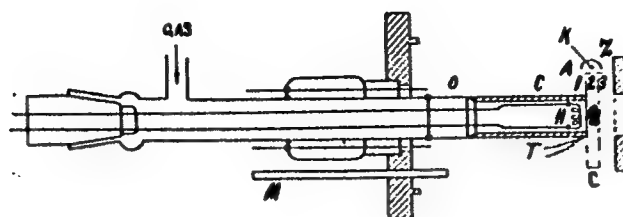
Fig. 1.

No new ions were found when hydrogen was passing through the membrane at temperatures between 80 and 750° C. The sensitivity of the spectrometer would allow the detection of currents of the order of 10^{-12} a/cm^2 of the Pa membrane. The authors did not observe any negative peaks whatsoever. After switching on the electron beam the ratio of the H^+/H_2^+ was 0.01 which can be due to the background of H radicals in the spectrometer chamber

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Investigations of Hydrogen and Deuterium
Desorption From Palladium by Means of a
Pulse Mass Spectroscope

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rather than to an effect of desorption. The authors
finally investigated an equimolecular hydrogen-deuterium
mixture. They first sent the mixture via the tube M and
observed in addition to the H_2 and D_2 peaks not more than

10% of HD molecules. However, when the mixture was sent
through the membrane, the ratio of the H_2^+, HD^+, and D_2^+

at 80° C would start with 4.0:3.5:1 values. With the
increase of temperature the ratio between H_2^+ and D_2^+

becomes nearly unity, showing that the isotopic differ-
ence of permeation decreases with the increase in
temperature. The high HD^+ content can be explained in
the following manner: The system of metal plus 2H and
metal plus H_2 potential curves have different shapes,

as shown on Fig. 3 by curves 1 and 2, respectively.
If the minimum of curve 1 is below the minimum of curve
2; the hydrogen is adsorbed in the form of atoms and
desorbed in molecular form. In that case the heat of

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Investigations of Hydrogen and Deuterium
Disorption From Palladium by Means of a
Pulse Mass Spectroscope

77315
SOV/57-30-2-12/18
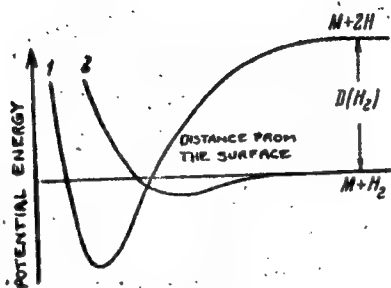
Card 5/6   Fig. 3.

Investigations of Hydrogen and Deuterium
Disorption From Palladium by Means of a
Pulse Mass Spectroscope

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SOV/57-30-2-12/18

desorption of hydrogen in the form of H_2 molecules is
smaller than the heat of desorption of two atoms of
hydrogen by the quantity $D(H_2) = 4.5$ ev. The experimental
results show then, that all the hydrogen and deuterium,
after crossing the diaphragm, first create on the outgo-
ing surface a chemosorbed layer of adatoms H and D. From
this layer, H and D desorb in the form of molecules of
H_2, HD and D_2 through a combination of H and D adatoms,
according to the laws of probability; E. I. Agishev
helped during the work. There are 3 figures; and 12
references, 5 Soviet, 2 French, 1 Japanese, 2 German,
1 U.K., 1 U.S. The U.K. and U.S. references are: C. H.
Bachman, P. A. Silberg, J. Appl. Phys., 29, Nr 8 (1958);
R. G. Stensfield, Proc. Cambr. Phil. Soc., 34, 120 (1938).

ASSOCIATION: Physico-Technical Institute AS USSR, Leningrad (Fiziko-
tekhnicheskiy institut AN SSSR, Leningrad)

SUBMITTED: August 14, 1959   Card 6/6

S/057/60/030/05/13/014
B012/B056

AUTHOR: Ionov, N. I.

TITLE: The Mechanism of the Conductivity of Electrode Spacings in the Vacuum Before Breakdown

PERIODICAL: Zhurnal tekhnicheskoy fiziki, 1960, Vol. 30, No. 5, pp. 561 - 567

TEXT: It is first pointed out that although numerous papers (Refs. 1-5) deal with the insulating properties of vacuum spacings, the theory of the detachment of particles is nevertheless not able to explain all experimental facts, whereas the assumptions which serve as a basis are not in keeping with the conceptions of cathode electronics. The difficulties arising in this connection are pointed out, and the conclusion is finally arrived at that hitherto no uniform theory on the conductivity of vacuum spacings exists, that might at least qualitatively explain all well-known facts found to occur in experiments. In the present paper several additional considerations concerning the mechanism of vacuum-spacing conductivity are given. These considerations are based on the special part

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The Mechanism of the Conductivity of Electrode   S/057/60/030/05/13/014
Spacings in the Vacuum Before Breakdown   B012/B056

played by ion-emission in the generation of conductivity in real spacings
(Ref. 6). Here, only the conductivity between real electrodes under real
vacuum conditions is investigated. The hypothesis is set up that the
conductivity of the spacing can be produced only by an emission of
negative ions from the cathode and of positive ions from the anode in an
electric field. This initial emission is then intensified by the secondary
ion-induced ion emission and ion-induced electron emission on the
electrodes. The conditions for a stability of the conduction current and
for the development of the ion-avalanche are given. On the basis of the
hypothesis given, all main facts established in the experiments with
respect to the conductivity of electrode spacings in the vacuum before
breakdown are explained. V. N. Glazanov and I. N. Slivkov as well as the
Schottky effect are mentioned in this paper. There are 14 references:
11 Soviet and 3 English.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN SSSR Leningrad (Institute
            of Physics and Technology of the AS USSR, Leningrad)

SUBMITTED: August 10, 1959

Card 2/2

84730

S/057/60/030/010/010/019
B013/B063

9. 4174
26. 1630

AUTHOR: Ionov, N. I.

TITLE: Theory of Vacuum Thermocouples

PERIODICAL: Zhurnal tekhnicheskoy fiziki, 1960, Vol. 30, No. 10,
            pp. 1210 - 1214

TEXT: The theory of vacuum thermocouples with plane electrodes was
established by A. I. Ansel'm (Ref.1) and L. N. Dobretsov (Ref.2) who as-
sumed that the space charge is fully compensated. The author gives a
more general and simpler solution to this problem. Fig. 1 shows the
Scheme of a plane diode whose electrodes are connected to the outer
resistor r. The author assumes that the work function φ_1 is larger than
the work function φ_2, and that the electrode temperature T_1 is higher
than the electrode temperature T_2. The current i, which is equal to the
difference between the thermal electron currents $i_1 - i_2$, flows through

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Theory of Vacuum Thermocouples   S/057/60/030/010/010/019
                                               B013/B063

the diode chain and a potential difference $V = ir$ occurs simultaneously
at the external resistor. The potential distribution in the diode chain
is schematically represented in Fig.2. The volt-ampere characteristics
of the currents i_1 and i_2 are plotted in Fig.3. Fig.4 shows the depen-
dence of δ (in volts) on T_1 for different values of T_2 and V_m. It is
concluded from the formulas derived that the quantities W_m (output) and

η_m (optimum efficiency) are practically independent of the quantity φ_2
within the limits of their possible values. These limits may, however,
be shifted by changing the quantity T_2. The formulas derived by the au-
thor hold for electrodes having uniform work functions. The work func-
tions on the surfaces of real electrodes are not uniform. Roughly speak-
ing, it may be assumed that the surface of the electrode consists of
various spots, the work function having different values of φ_1, which

are, however, constant within each of the spots. Next, the question as
to whether the formulas derived may also be applied to "heat converters"

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Theory of Vacuum Thermocouples   S/057/60/030/010/010/019
                                                  B013/B063

with spotty electrodes is considered for two limiting cases. As con-
verters of heat into electric energy, such diodes will be of practical
value, whose current density will amount to amperes and dozens of am-
peres per cm^2. This is, however, only possible if the electron space
charge is fully compensated by positive ions (e.g., cesium). Full com-
pensation of the electron space charge by surface ionization alone is
possible only in an electric field with zero strength. The author
thanks Professor L. N. Dobretsov for valuable discussions. There are
4 figures and 2 Soviet references:

ASSOCIATION: Fiziko-tekhnicheskiy institut AN SSSR, Leningrad
               (Institute of Physics and Technology AS USSR, Leningrad)

SUBMITTED: May 13, 1960

Card 3/3

83752

S/056/60/038/004/045/048
B006/B056

24.6100
AUTHORS: Ionov, N. I., Mittsev, M. A.

TITLE: Determination of the First Ionization Potentials of
              Neodymium and Praseodymium Atoms by the Method of Surface
              Ionization

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1960,
              Vol. 38, No. 4, pp. 1350 - 1351

TEXT: In the present "Letter to the Editor", the authors give a report
on the determination of ionization potentials by the method of surface
ionization, which is described in detail in Ref. 2. Indium was used as
a reference element, for which the potential $V = 5.79$ ev had been
spectroscopically determined. The potentials were determined by way of
a determination of the temperature dependence of the ion current ratio
J_1/J_2 from the formula $\log(J_1/J_2) = \log(n_1 A_1/n_2 A_2) + 5040(V_1 - V_2)/T$,
where $A = Q_+/Q_0$ is the ratio of the statistical sums of state of the
positive ion Q_+ and of the atom Q_0. From the diagrams $\log(J_1/J_2) = f(1/T)$,

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83752

Determination of the First Ionization   S/056/60/038/004/045/048
Potentials of Neodymium and Praseodymium B006/B056
Atoms by the Method of Surface Ionization

it is thus possible to determine   the difference $V_1 - V_2$ for the pairs
Pr - In and Nd - In. From seven independent coefficient determinations
from the diagrams (cf. Fig. 2), (0.22 ± 0.01) and (0.19 ± 0.02) ev were ob-
tained for the two pairs. The final values for the first ionization
potentials are $V_{Pr} = (5.48 \pm 0.01)$ ev and $V_{Nd} = (5.51 \pm 0.02)$ ev. There
are 2 figures and 3 references: 2 Soviet and 1 British.

ASSOCIATION: Leningradskiy Fiziko-tekhnicheskiy institut Akademii
nauk SSSR (Leningrad Institute of Physics and Technology
of the Academy of Sciences USSR)

SUBMITTED: February 2, 1960

Card 2/2

21. 3220 (1395, 1422, 1138)

AUTHORS: Belyakov, Yu. I. and Ionov, N. I.

TITLE: Penetration of hydrogen and deuterium through a nickel mem-
              brane in the temperature range from 250-600°C

PERIODICAL: Zhurnal tekhnicheskoy fiziki, v. 31, no. 2, 1961, 204-210

TEXT: The authors describe experiments of studying the penetration of H_2
and D_2 through a flat nickel membrane at a temperature range of 250-600°C
by using a pulsed mass spectroscope (Ref. 7). On the basis of these ex-
periments, the authors determined empirical rules governing diffusion,
permeability, and solubility of H_2 and D_2 in nickel below and above the
point of magnetic conversion. In the given temperature range nickel has, in
the case of high permeability, very stable diffusion properties, and no
structural defects are formed on protracted penetration of H_2 through the
membrane (Refs. 8, 9). These properties of nickel are important when
determining possible small isotopic effects. The scheme of the experimental

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Penetration of hydrogen ...

device is shown in Fig. 1; it consists of three main parts: 1) pulsed mass spectroscope IMS, 2) diffusion cell B, and 3) supply system of the gas into cell B and IMS for calibrating the latter with respect to the gas flow. L is the Pd supply pipe, K a stopcock, IMS and the supply system were evacuated by means of two independent vapor – oil pressure pumps ЦВЛ-100 (TsVL-100), i.e., in the former to a residual pressure of about $5 \cdot 10^{-7}$ mm Hg and in the latter to some 10^{-6} mm Hg. With a resolution of 60 the sensitivity of IMS to H_2 and D_2 with respect to the vertical displacement of the oscilloscope beam of 1 mm is equal to $1.84 \cdot 10^{-7}$ and $2.92 \cdot 10^{-7}$ mm.l/sec, respectively. The diffusion cell B is schematically shown in Fig. 2. The cup-shaped nickel membrane M with flat bottom (area.A $= 2.55 cm^2$, thickness d $= 0.395$ mm) was welded to the thick-walled steel cylinder C (wall thickness 10 mm) by means of copper. The cylinder C was hermetically connected with the flange F. The membrane was heated to 650-700°C by an external furnace P, the temperature was measured by a Pt-PtRh thermocouple with an accuracy of $\pm 5°$. The time dependence of the height of the peaks of H_2^+ or D_2^+ ions was measured for three different temperatures T (Fig. 3).

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4

Penetration of hydrogen ...

S/057/61/031/002/008/015
B124/B202

The area $F = \int_0^t l(t)dt$ bounded by curve $l(t)$ and the axis of time is

proportional to the total amount of gas which has passed through the membrane during the time t. Fig. 4 shows the diagram $F(t)$ for three different membrane temperatures. Fig. 5 shows the dependence of the quantities $D(2)$ and $P(1)$ (D --- diffusion coefficient, P --- specific permeability) on $1/T$. The calculated values of E_D (activation energy of diffusion), E_p (activation energy of permeability), P_o and D_o (which are constants under the given conditions), S_o (solubility of the isotopes in nickel), and E_s (dissolution temperature) are given in the table. These data indicate that 1) $S_{oH} = S_{oD}$, 2) $E_{DH} = E_{DD}$, 3) E_p and E_s of deuterium in nickel are by 800-900 cal./g-at. higher than in the light isotope, and 4) $D_o : P_o$ in both hydrogen isotopes is equal to $\sqrt{2}$. The penetration of hydrogen into the nickel lattice can be divided into several stages as is illustrated by the energy

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Penetration of hydrogen ...

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B124/B202

diagram shown in Fig. 6. An abrupt change of the diffusion properties of the system H_2-Ni is observed at the Curie point. The isotope effects observed are explained by the different dissociation energies of the molecules H_2 and D_2 and the different characteristic oscillation frequencies. There are 6 figures, 1 table, and 13 references: 4 Soviet-bloc and 9 non-Soviet-bloc.

ASSOCIATION: Fiziko-tekhnicheskiy institut im. A. F. Ioffe AN SSSR Leningrad (Institute of Physical Technology im. A. F. Ioffe AS USSR, Leningrad)

SUBMITTED: June 30, 1960

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   4

22125

S/056/61/040/003/005/031
B111/B202

26.2312

AUTHORS: Ionov, N.I., Mittsev, M.A.

TITLE: Determination of the first ionization potentials of atoms
             by the method of surface ionization

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki,
             v. 40, no. 3, 1961, 741 - 742

TEXT: The authors present the results of surface ionization of Er, Tb, Ce
atoms   and $ThCl_4$ molecule on polycrystalline tungsten. It is demon-
strated that the temperature dependence of the ion currents is in line with
the formula for the surface ionization on complex surfaces.. The ionization
potentials of Er, Tb, Ce and Th atoms were obtained by comparing these
functions with the time dependence of the current of positive In ions. At
sufficiently high temperatures the functions shown in Fig. 1 are well ap-
proximated by straight lines. The standard element In has the ionization
potential V_{In} = 5.79 ev. Also the functions represented in Fig. 2 can be

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S/056/61/040/003/005/031
B111/B202

Determination of the first ...

approximated by straight lines. The differences of the ionization poten-
tials of In and Er, Tb, Ce, Th can be determined from their inclination;
the following values are obtained: $V_{Er} = 6.08 \pm 0.03$ ev,
$V_{Tb} = 5.98 \pm 0.02$ ev, $V_{Ce} = 5.60 \pm 0.05$ ev, $V_{Th} = 6.95 \pm 0.06$ ev. In all
calculations, the lowest excited states of the atoms and positive ions of
In were taken into account. With Er, Tb, Ce and Th atoms and ions the ex-
citation states were not considered since the position of the energy le-
vels of these elements is unknown. There are 2 figures and 3 Soviet-bloc
references.

ASSOCIATION: Leningradskiy fiziko-tekhnicheskiy institut Akademii nauk
SSSR (Leningrad Institute of Physics and Technology of
the Academy of Sciences SSSR)

SUBMITTED: October 3, 1960

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S/056/61/040/003/005/031
B111/B202

22125

Determination of the first ...

Legend to Fig. 1:
1) $\log(I/I_m)$

logarithm of the re-
lative positive-ion
currents (ordinate);
T) temperature of
the tungsten fibers
(abscissa)

Fig 1.
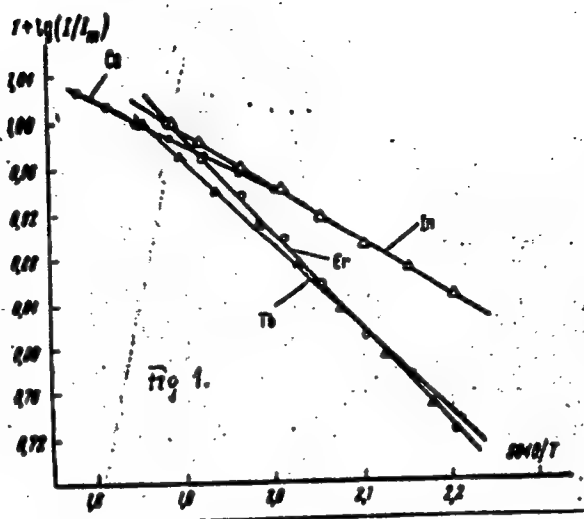
Card 3/4-3

ZANDBERG, E.Ya.; IONOV, N.I.

Emission of positive molecular ions from heated surfaces in vacuum. Dokl. AN SSSR 141 no.1:139-142 N '61.
(MIRA 14:11)

1. Fiziko-tekhnicheskiy institut im. A.F.Ioffe AN SSSR.
Predstavleno akademikom B.P. Konstantinovym.
(Ionization)

S/120/62/000/003/029/048
39163
E032/E114

5.5310

AUTHORS: Ionov, N.I., and Karatayev, V.I.

TITLE: A double magnetic mass spectrometer for the analysis
            of small impurities

PERIODICAL: Pribory i tekhnika eksperimenta, no.3, 1962, 119-122

TEXT: One of the most important aims of analytical mass
spectrometry is the development of methods for the quantitative
analysis of very pure materials, capable of determining the
presence of small impurities (10^{-4}-10^{-8}%). This means that the
appropriate mass spectrometer must be able to handle mass lines
differing in intensity by a factor of 10^6-10^{10}. The present
authors describe a two-stage mass spectrometer which is capable
of achieving this. It uses a uniform magnetic field and the
average ion trajectories take the form of semicircular arcs with
radii r_1 (first stage) and r_2 (second stage), as shown in Fig.3.
The spectrometer chamber is in the form of a brass cylinder
20 cm in diameter, 4 cm long. The chamber is divided into two
parts by means of a partition with slits $Ш_1$, $Ш_2$, $Ш_3$ and
$Ш_6$. Ions leaving the source through $Ш_1$ pass through $Ш_2$,

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A double magnetic mass spectrometer...   S/120/62/000/003/029/048
                                           E032/E114

reaching the collector K_1. Alternately they can pass through
Ш_3 and Ш_4 into the second stage of the device and then through
Ш_5 and Ш_6 on to the second collector K_2. The motion in the
second stage takes place in the stainless steel container D
which is insulated from the main chamber. A potential difference
is applied between the two chambers so as to reduce the ion
velocity between Ш_3 and Ш_4. Ion currents to K_1 and K_2 are
measured by independent electrometers ЭМУ-3 (EMU-3). The
residual gas pressure was of the order of 10^{-7} mm Hg.   Fig.4
shows a spectrum obtained with the first stage only, and Fig.5
the same spectrum as recorded by K_2. It is noted that comparable
results were obtained by F.A. White and T.L. Collins (Appl.
Spectroscopy, 8, 1954, 169) with a very much more complicated
apparatus. There are 5 figures.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN SSSR
              (Physicotechnical Institute, AS USSR)

SUBMITTED: October 30, 1961)

Card 2/9 2

37071
S/057/62/032/004/017/017
B173/B102

26.1640   26,2312

AUTHORS: Zandberg, E. Ya., Ionov, N. I., Paleyev, V. I., and
            Tontegode, A. Ya.

TITLE: Determination of thermionic emission constants from energy
            distribution curves for thermoelectrons and positive ions

PERIODICAL: Zhurnal tekhnicheskoy fiziki, v. 32, no. 4, 1962, 503 - 516

TEXT: For plane and coaxially cylindrical electrodes with homogeneous
work function, expressions ("ideal" retardation curves) for the emission
current are derived on the assumption of Maxwellian energy distribution,
and extended to electrodes with inhomogeneous work function (experimental
retardation curves). As the areas of different work function (spots)
cannot be localized, only a qualitative consideration is possible. The con-
tact potential field of the spots is regarded first as being compensated
by the external field (independent emission of individual spots) and then
as not being compensated. The mean work function of the cathode was deter-
mined from the saturation current at given temperature. An apparent con-
tact potential difference, which can be determined from the experimental

Card (1/2)

Determination of thermionic...

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curves and is related to the mean work functions of the electrodes in the same manner as the contact potential difference between homogeneous electrodes is to their work functions, is assumed for the arrangement of electrodes with inhomogeneous emission. The electron gas temperature for the experimental case of inhomogeneous electrodes is determined in the same way as for the ideal case of homogeneous electrodes. The retardation curves of the positive ion current caused by surface ionization at the cathode are considered analogously. The case of a compensated contact potential field was experimentally investigated in a vacuum tube with co-axially arranged triodes (polycrystalline tungsten cathode) and with a container for metallic Cs. Retardation curves for thermoelectrons ($T > 2000^{\circ}K$) and positive Cs ions ($T = 1200^{\circ}K$) were plotted, and the mean work functions, the apparent contact potential difference, and the mean temperatures deter-mined. The compensation of the electron space charge by positive Cs ions was examined in the same tube, used as a diode system. There are 9 figures.

ASSOCIATION: Fiziko-tekhnicheskiy institut im. A. F. Ioffe AN SSSR, Lenin-grad (Physicotechnical Institute imeni A. F. Ioffe AS USSR, Leningrad)

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26.2312

AUTHORS: Ionov, N. I., and Karatayev, V. I.

TITLE: The distribution of initial velocities of thermoelectrons and
of K^+ and Cl^- ions produced by the surface ionization of KCl
molecules on tungsten and tantalum

PERIODICAL: Zhurnal tekhnicheskoy fiziki, v. 32, no. 5, 1962, 626 - 631

TEXT: An experimental arrangement (Fig. 1) is described which enables
determination of the distribution of the normal and tangential components
of the initial velocities of thermoelectrons and positive and negative ions.
The normal components of the initial velocities of K^+ ions and thermo-
electrons produced by ionization on W and Ta have Maxwellian distribution
up to relatively high V_3 potentials (-2.5 v). The distribution was

measured at the temperature of the emitter. Deviations from Maxwellian
distribution at low V_3 values are explained by the nonuniformity of the work

functions of emitter and collector. The tangential components of the
initial velocities of thermoelectrons and K^+ ions from a spot emitter

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possess Maxwellian distribution only when the contact field is neutralized
by an external accelerating field. This is the experimental proof of the
existence of a temperature equilibrium on surface ionization of KCl molecule
on W and Ta and of the fact that the accomodation coefficient of the
molecule equals one. The tangential components of the initial velocities of
Cl⁻ ions on the ionization of KCl on W have Maxwellian distribution. The
volume ionization of KCl molecules by thermoelectrons is small. There are
5 figures.

ASSOCIATION: Fiziko-tekhnicheskiy institut im. A. F. Ioffe AN SSSR
               Leningrad (Physicotechnical Institute imeni A. F. Ioffe AS
               USSR, Leningrad)

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Fig. 1. Diagram of the experimental arrangement.
Legend: (И) emitter; (Э$_1$) and (Э$_2$) accelerating electrodes; (П) KCl quartz
vaporizer; (O) plate capacitor; (A) grid analyzer; (K) cathode; (V$_3$)
potential between the middle grid of the analyzer and the emitter; (1) to
the photomultiplier.
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